Booting HP ProLiant servers from a storage area network

HOWTO, 2nd edition

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Abstract

Traditionally, HP ProLiant servers boot operating systems (OSs) from internal SCSI and IDE storage devices. Now, certain HP ProLiant server, StorageWorks Fibre Channel host bus adapter (HBA), and RAID array combinations support external OS booting. Customers can choose to eliminate server-based internal boot devices. Booting from an external device decreases downtime by enabling faster server replacement in the event of a server failure and provides other benefits, including the following:

- Redundant storage paths
- Disaster recovery
- Improved security
- Minimized server maintenance
- Reduced impact on production servers
- Reduced backup time

This paper consolidates available resources with information about booting from SAN, points customers to vital information, and contains procedures for deploying OSs.

Required hardware

To avoid issues when booting a ProLiant server from a SAN, it is essential to verify that your hardware configuration supports booting from SAN and that you have the required firmware installed.

Supported firmware versions

Outdated firmware is a common cause of server problems. Firmware updates provide the latest available fixes and are essential for optimal system performance and system stability.

For information on the latest firmware versions for server and storage systems, visit the HP website at http://welcome.hp.com/country/us/en/support.html?jumpid=hpr_R1002_USEN.

Supported Fibre Channel switches

The matrix at ftp://ftp.compaq.com/pub/products/servers/support/Boot_from_SAN_Fibre_Channel_Switch_Support_Matrix.pdf lists which ProLiant servers are supported for Fibre Channel switch and HP StorageWorks array combination that supports booting from SAN.

Verifying compatibility and support among system products can help avoid problems in the future.

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Setting up LUN on HP StorageWorks arrays and zoning on Fibre Channel switches

NOTE:
All supported OSs must be zoned to only have a single path to the target LUN during an OS install. After installation, a multi-path driver (MPIO, SecurePath, etc.) must be installed before multiple paths are presented to the host. This is true for any SAN and any switch vendor. If the OS is not single-path during the install, the OS returns various errors.

In boot from SAN configurations, the boot paths must be on the active path to the boot logical unit number (LUN) and switch zoning must be set up unless directly connected to the array.

The following documents contain information about setting up LUN on HP StorageWorks arrays and zoning on Fibre Channel switches:

- 32-bit Linux systems:
  http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00166137/c00166137.pdf
- Itanium-based Linux systems:
  http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00166110/c00166110.pdf
- Windows Server 2003 and Windows Server x64 edition systems:
  http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00099862/c00099862.pdf

Deploying the OS by CD overview

The following steps provide an overview a CD installation:

1. Download, but do not install, the latest HBA drivers, SmartStart, and the ProLiant Support Pack.

   NOTE:
   The latest HBA drivers are available at http://h18006.www1.hp.com/storage/saninfrastructure/hba.html.

2. Insert the OS CD into the Boot from SAN host system CD-ROM drive and reboot the host system. The installation begins.

   NOTE:
   You may be prompted for additional OS CDs or driver diskette during the installation.

3. Follow the installation instructions that appear on the screen.
4. Load the OS to the Boot LUN on the SAN.
5. When the Installation Complete window appears, press **Enter** to complete the installation and reboot the system. This step completes the configuration.
6. Install the latest HBA drivers that you downloaded in Step 1.

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Deploying the OS by Rapid Deployment Pack overview

IMPORTANT:
These instructions illustrate how to use Windows Edition 3.00 (or greater) to deploy an OS on a ProLiant BL server with a QLogic Fibre Channel Host Bus Adapter (FC HBA) that boots from an HP StorageWorks Storage Area Network (SAN). If you are using Windows Edition 1.00, you must upgrade to Windows Edition 3.00.

Before you start

Consult the HP ProLiant Essentials Rapid Deployment Pack – Windows Edition Support Matrix at http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01174425/c01174425.pdf?jumpid=reg_R1002_USEN to determine which ProLiant servers and OSs are supported for Boot From SAN deployment with RDP. Refer to the three support manuals listed in the "Setting up LUN on HP StorageWorks arrays and zoning on Fibre Channel switches" section for important details about SAN configurations and minimum firmware versions for boot from SAN.

Instructions

Complete the following steps to deploy the OS using RDP:

1. Ensure that the target server is cabled in a single path configuration (only one active channel). It is possible to cable both paths and to zone only a single port to have access to the boot LUN until the server OS install is complete and the multipathing software is installed.

2. Ensure that the server has booted PXE and is waiting in the Deployment Server Console.

3. Provision the SAN storage for the target server to execute the Read ProLiant ML/DL/BL QLogic HBA Configuration [server specific] job from the Server Deployment Toolbox\1 - Hardware Configuration\HBA job folder on the target server. This job will create the file *.\lib\hwconfig\hba\ID.ini* where ID is the target server's computer ID. For example, the generated file might look like this:

```
[HBA0]
WWID=500508b200713e72
HostAdapterBiosEnable=0 (this should be set to 0 like a new server)
SelectBootEnable=0(this should be set to 0 like a new server)
BootDeviceWWID=
BootDeviceLUN=
[HBA1]
WWID=500508b200713e73
HostAdapterBiosEnable=0
SelectBootEnable=0
BootDeviceWWID=
BootDeviceLUN=
```


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NOTE:
To determine the target server's computer id:

For Windows Edition, right-click on the target server, select **Properties**, select **General**, and then look for the ID field.

For Linux Edition, click on **New Computers** or **All Computers**. Move the mouse cursor over the target server. In the browser status bar, the computer's ID is shown in the link description as ID=.

4. Create a LUN for the target server's boot volume. Notice the WWID of the boot controller and the LUN number that was created.
5. Using the target server's HBA WWID from the file created in Step 3, configure the SAN switches for zoning or Selective Storage Presentation as needed in your environment.
6. Configure the target server's HBA to boot from the provisioned SAN storage.
7. Edit the file created in Step 3 to add the boot controller WWID and LUN from Step 3. The boot volume must be set up as the first visible LUN. For example,

```
[HBA0]
WWID=500508b200713e72
HostAdapterBiosEnable=1
SelectBootEnable=1
BootDeviceWWID=395442c135713a41
BootDeviceLUN=01
[HBA1] WWID=500508b200713e73
HostAdapterBiosEnable=0
SelectBootEnable=0
BootDeviceWWID=395442c135713a42
BootDeviceLUN=01
```

NOTE:
Use Microsoft WordPad instead of Microsoft Notepad because Notepad does not read or write the line feeds correctly.

8. Execute the Write ProLiant ML/DL/BL QLogic HBA Configuration [server specific] job from the Server Deployment Toolbox\1 - Hardware Configuration\HBA job folder on the target server.
9. Execute the Deploy ProLiant BL System Configuration (Boot From SAN) job from the Server Deployment Toolbox\1 - Hardware Configuration\System job folder on the target server.

   This job disables the embedded array controller and put the HBA controller first in the boot order. Customers who will use local storage as well as SAN must modify the pl-bfs.ini file.
10. Deploy an OS to the target server using any of jobs from the Server Deployment Toolbox\2A - OS Installation (Imaged) or Server Deployment Toolbox\2B - OS Installation (Scripted) job folders.

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Scripted installs

If multiple LUNs ore visible to the HBA, by defoult the Red Hot Linux kickstort file will instoll Linux portitions ocross the ovoiloble LUNs. In most coses, it is desiroble to ploce the OS portitions on the first LUN. To do this, copy ond renome the desired kickstort file ond odd the following to the end of eoch port commond:

```
--ondisk=sda
```

On Red Hot Enterprise Linux 3, you must specify the locotion of the bootlooder. To ploce the grub bootlooder on the first LUN, odd the following to the end of the bootlooder commond in your kickstort file:

```
--driveorder=sda
```

Copy ond modify the desired job to point to the modified kickstort file.

Setting up two poths to the LUN (for exomple, through both HBAs on o blode) will couse on OS foilure due to o drive thot is "unformotted, domoged, or formotted with o file system thot is incompotible" or return errors like "Involid Portition." The OS must be instolled in o single poth configurotion. To resolve the issue, either remove one of the HBA cobles or set up the SAN switch zoning to ollow occess to the LUN from only the first HBA ond one orroy controller port. After the OS is instolled, instoll the multipothing softwore ond enoble the second HBA to occess the LUN.

Image deployment

After deploying the first server using scripting, you con deploy odditionol servers using imoging. To deploy o server with on embedded orroy controller to boot from SAN using imoging, you must first modify the provided imoge deployment jobs in the Server Replicotion job folder to eliminote the orroy configurotion tosks. Copy ond renome the oppropriote job, ond then delete the third ond fourth tosks.

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For more information

For additional information, refer to the resources listed below.

Source	Hyperlink
HP StorageWorks SAN Design Reference Guide	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00403562/c00403562.pdf
Regular Firmware Updates Essential for Optimal Performance and Functionality of HP ProLiant Servers	http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00264524/c00264524.pdf

Call to action

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